

X12

Patient Monitor

Version 1.0

Data Sheet





X12 Specification

Physical Specifications

Dimension	306±2 mm (W) × 309±2 mm (H) × 151±2 mm (D)
Max Weight	< 3.5 kg Standard configurations, no battery or accessories

Power Supply

Line Voltage	100 V to 240 V~
Current	1.4 A to 0.7 A
Frequency	50 Hz/60 Hz

Battery

Capacity	2550 mAh , 5100 mAh	
Operating Time	2550 mAh	≥ 4 h
	5100 mAh	≥ 8 h
Charge Time	2550 mAh	≤ 3.5 h, 90% charge
	5100 mAh	≤ 6.5 h, 90% charge

Display

Display screen	12.1-inch color TFT screen, touch screen available
Resolution	800 × 600
Waves	A maximum of 13 waveforms can be displayed on the same screen

Recorder

Record Width	48 mm
Paper Speed	12.5 mm/s, 25 mm/s, 50 mm/s
Channels	3

Recording Types	<ul style="list-style-type: none"> Continuous real-time recording 8-second real-time recording 20-second real-time recording Time recording Alarm recording Trend graph recording Trend table recording NIBP review recording Arrhythmia review recording Alarm review recording Drug calculation titration recording Hemodynamic Calculation result recording 12-lead analysis recording C.O. measurement recording
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Data Storage

Internal Temporary Memory	Trend graph/trend table review	3 hrs, at 1 s resolution 120 hrs, at 1 min resolution
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	Alarm/Monitoring Event data	Up to 200 sets
	NIBP Measurement Review	1200 sets
	Arrhythmia events	Up to 200 sets
	12-lead Diagnosis Review	Up to 50 sets
Non-volatile Memory (internal or external storage device)	A single piece of patient data maximally contains the following information:	
	Trend graph and trend table	240 hours, at 1 min resolution
	NIBP measurement review	1200 sets
	Alarm review	200 sets
	Arrhythmia event	200 sets
	12-lead diagnosis review	50 sets
	Waveforms	48 hours
Wi-Fi		
IEEE	802.11b/g/n	
Frequency Band	2.4 GHz ISM band	
Interfaces and others		
VGA output (optional)	1	
USB interface	2	
Nurse call / analog output/ defibrillator synchronization (optional)	1	
Network Interface	1	
Data Transmission		
Data Export	Ethernet / USB	
Data Management	Patientcare Viewer	
Central Monitoring System	MFM-CMS	
HIS/EMR connection	HL7 MFM-CMS / GW1 Gateway Software	
ECG		
Lead Mode	3-Electrode: I, II, III 5-Electrode: I, II, III, aVR, aVL, aVF, V 6-Electrode: I, II, III, aVR, aVL, aVF, and leads responding to Va, Vb 10-Elctrode: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	
Lead naming style	AHA, IEC	
Display Sensitivity (Gain Selection)	1.25 mm/mV (×0.125), 2.5 mm/mV (×0.25), 5 mm/mV (×0.5), 10 mm/mV (×1), 20 mm/mV (×2), 40 mm/mV (×4), AUTO gain	
Sweep speed	6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s	
Bandwidth (-3 dB)	Diagnosis: 0.05 Hz to 150 Hz Surgery 1: 0.05 Hz to 40 Hz Monitor: 0.5 Hz to 40 Hz Surgery: 1 Hz to 20 Hz Enhanced: 2 Hz ~18 Hz Customized: High-pass Filter and Low-pass Filter	



CMRR	Diagnosis: > 95 dB Monitor: > 105 dB Surgery: > 105 dB Enhanced: > 105 dB Surgery 1: > 105 dB (when Notch is turned on) Customized: > 105 dB (Low-pass Filter < 40 Hz) > 95 dB (Low-pass Filter > 40 Hz)		
Hum Filter	In diagnosis, Surgery 1, monitor, surgery, enhanced modes: 50Hz/60 Hz (Hum filter can be turned on or off manually)		
Recovery time after defibrillation	<5 s		
ESU Protection	Cut mode: 300 W Coagulation mode: 100 W Restore time: ≤10 s		
Pace pulse detecting lead	one among I, II, III, AVR, AVL, AVF, V1, V2, V3, V4, V5, V6		
Heart Rate			
Range	Adult: 15 bpm to 300 bpm Ped: 15 bpm to 350 bpm		
Accuracy	±1% or ±1 bpm, whichever is greater		
Resolution	1 bpm		
PVC			
Range	Adult: 0 to 300 PVCs/ min Ped/Neo: 0 to 350 PVCs/ min		
Resolution	1 PVCs/min		
ST value			
Range	-2.0 mV to +2.0 mV		
Accuracy	±0.02 mV or 10% (-0.8 mV to +0.8 mV), whichever is greater. Beyond this range: not specified.		
Resolution	0.01 mV		
Arrhythmia analyses			
Asystole	Sustain VT	V-Fib/V-Tach	ExtremeTachy
ExtremeBrady	V-Tach	Vent Brady	Tachy
Brady	Wide QRS Tachy	Non-Sustain VT	Afib
Vent Rhythm	Acc. Vent Rhythm	Pause	Pauses/min High
PVCs High	R on T	PVC Bigeminy	PVC Trigeminy
Pacer not Pacing	Pacer not Capture	Missed Beat	VEB
PVC	Couplet	Run PVCs	Multiform PVCs
IPVC	Irr Rhythm	PAC Bigeminy	PAC Trigeminy
Low Voltage(Limb)			



12-lead ECG synchronization analysis		
Average parameters of heart beat		
Heart rate (bpm)		
Time limit of P wave (ms)		
PR interval (ms)		
QRS interval (ms)		
QT/QTc (ms)		
P-QRS-T AXIS		
RESP		
Method	Trans-thoracic impedance: R-F(RA-LL), R-L (RA-LA)	
Measurement lead	Options are lead I and II	
Measuring Range	Adult	0 rpm to 120 rpm
	Ped/Neo	0 rpm to 150 rpm
Resolution	1 rpm	
Accuracy	Adult	6 rpm to 120 rpm: ± 2 rpm 0 rpm to 5 rpm: not specified
	Ped/Neo	6 rpm to 150 rpm: ± 2 rpm 0 rpm to 5 rpm: not specified
Gain Selection	$\times 0.25$, $\times 0.5$, $\times 1$, $\times 2$, $\times 3$, $\times 4$, $\times 5$	
Sweep	6.25 mm/s, 12.5 mm/s, 25.0 mm/s, 50.0 mm/s	
Apnea Alarm Time	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s	
NIBP		
Method	Oscillometry	
Mode	Manual, Auto, Continuous	
Measuring Interval in Auto Mode	1/2/3/4/5/10/15/30/60/90/120/180/240/360/480 min	
Continuous	5 min, interval is 5 s	
Measuring Type	SYS, DIA, MAP, PR	
Measuring Range	Adult Mode	SYS: 25 mmHg to 290 mmHg DIA: 10 mmHg to 250 mmHg MAP: 15 mmHg to 260 mmHg
	Pediatric Mode	SYS: 25 mmHg to 240 mmHg DIA: 10 mmHg to 200 mmHg MAP: 15 mmHg to 215 mmHg
	Neonatal Mode	SYS: 25 mmHg to 140 mmHg DIA: 10 mmHg to 115 mmHg MAP: 15 mmHg to 125 mmHg
Cuff Pressure Measuring Range	0 mmHg to 300 mmHg	



Pressure Resolution	1 mmHg	
Maximum Mean Error	±5 mmHg	
Maximum Standard Deviation	8 mmHg	
Maximum Measuring Period	Adult/ Pediatric	120 s
	Neonatal	90 s
Typical Measuring Period	20 s to 35 s (depend on HR/motion disturbance)	
Overpressure Protection	Adult	297 mmHg±3 mmHg
	Pediatric	245 mmHg±3 mmHg
	Neonatal	147 mmHg±3 mmHg
PR		
Measuring range	40 bpm to 240 bpm	
Accuracy	±3 bpm or 3.5%, whichever is greater	
SpO₂		
Measuring Range	0% to 100%	
Resolution	1%	
Data update period	1 s	
Accuracy	Adult/Pediatric	±2% (70% to 100% SpO ₂) Undefined (0% to 69% SpO ₂)
	Neonatal	±3% (70% to 100% SpO ₂) Undefined (0% to 69% SpO ₂)
PI (Perfusion Index)		
Measuring Range	0-10	
Resolution	1	
Pulse Rate		
Measuring Range	25 bpm to 300 bpm	
Accuracy	±2 bpm	
TEMP		
Channel	2	
Sensor type	YSI-10K and YSI-2.252K	
Technique	Thermal resistance	
Measure Parameter	T1, T2, TD	
Position	Skin, Oral, Rectum	
Unit	°C , °F	
Measuring Range	0°C to 50°C (32 °F to 122 °F)	
Resolution	0.1°C (0.1 °F)	
Accuracy	Accuracy (not including sensor): ±0.1°C	
	Sensor accuracy: ≤ ±0.2°C	
Transient Response Time	≤ 30 s	

IBP			
Channel	1/2		
Technique	Direct invasive measurement		
Measuring range	Art	0 mmHg to +300 mmHg	
	PA	-6 mmHg to +120mmHg	
	CVP/RAP/LAP/ICP	-10 mmHg to +40 mmHg	
	P1/P2	-50 mmHg to +300 mmHg	
Resolution	1 mmHg		
Accuracy	±2% or ±1 mmHg, whichever is greater (not including sensor)		
Unit	kPa, mmHg, cmH2O		
PR			
Measuring Range	20 bpm to 300 bpm		
Accuracy	30 bpm to 300 bpm: ±2 bpm or ±2%, whichever is greater; 20 bpm to 29 bpm: undefined		
CO₂			
Intended patient	Adult, Pediatric, Neonatal		
Measure Parameters	EtCO ₂ , FiCO ₂ , AwRR		
Unit	mmHg, %, kPa		
Measuring Range	CO ₂	0 mmHg to 150 mmHg (0% to 20%)	
	AwRR	2 rpm to 150 rpm	
Resolution	EtCO ₂	1 mmHg	
	FiCO ₂	1 mmHg	
	AwRR	1 rpm	
Accuracy	EtCO ₂	±2 mmHg, 0 mmHg to 40 mmHg	Respiratory rate≤60 rpm
		±5% of reading, 41 mmHg to 70 mmHg	
		±8% of reading, 71 mmHg to 100 mmHg	
		±10% of reading, 101 mmHg to 150 mmHg	
	±12% of reading or ±4 mmHg, whichever is greater	Respiratory rate>60 rpm	
AwRR	±1 rpm		
Sample Gas Flowrate	50 ml/min, 70 ml/min or 100 ml/min(default), accuracy: ±15 ml/min		
Warm-up time	Display waveform within 20 s, Reach the design accuracy within 2 minutes.		
Response time	<4 s		
Barometric pressure compensation	Automatic		
Zero Calibration	Support		
Calibration	Support		
Apnea alarm delay	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s		



C.O.		
Technique	Thermodilution Technique	
Measure Parameters	C.O., TB, TI	
Measuring Range	C.O.	0.1 L/min to 20 L/min
	TB	23°C to 43° C(73.4 °F to 109.4 °F)
	TI	-1° C to 27° C(30.2 °F to 80.6 °F)
Resolution	C.O.	0.1 L/min
	TB, TI	0.1° C (+0.1 °F)
Accuracy	C.O.	±5% or ±0.2 l/min, whichever is greater
	TB	±0.1° C (not including sensor)
	TI	±0.1° C (not including sensor)
Safety Specifications		
Compliant with Standards	IEC 60601-1: 2005+A1 :2012; IEC 60601-1-2: 2014; EN 60601-1: 2006+A1 :2013; EN 60601-1-2: 2015; IEC 60601-2-49: 2011	
Anti-electroshock Type	Class I equipment and internal powered equipment	
Anti-electroshock Degree	CF	
Ingress Protection	IPX1	
Environmental Specifications		
Temperature	Working	+0°C to +40°C (32 °F ~104 °F)
	Transport and Storage	-20°C to +55°C (-4 °F ~131 °F)
Humidity	Working	15%RH to 95%RH (non-condensing)
	Transport and Storage	15%RH to 95%RH (non-condensing)
Altitude	Working	86 kPa to 106 kPa
	Transport and Storage	70 kPa to 106 kPa

* Specifications are subject to change without prior notice



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